

WHAT IS CLAIMED IS:

1. An image forming apparatus, comprising:
an image bearing member on a surface of which an electrostatic latent image is formed;
5 developing means which contains a developer and which has: a rotatable developer carrying member, which abuts against the surface of the image bearing member; and storage means storing information on image formation history, said developing means being adapted
10 to visualize the electrostatic latent image on the surface of the image bearing member as the developer carrying member carries the developer to the electrostatic latent image;
a contact/separation mechanism which enables the
15 developer carrying member to abut against and separate from the surface of the image bearing member; and
control means which, in a preparation process before image formation of second and subsequent times using the developing means, finds a lapsed time from a
20 finish time of image formation of the last time until a start time of image formation of this time based upon the information on image formation history stored in the storage means and, in a state in which the image bearing member and the developer carrying member are
25 separated from each other by the contact/separation mechanism, operates the developer carrying member for a predetermined period of time according to the lapsed

time.

2. An image forming apparatus according to claim
1, further comprising developer remaining amount
5 detection means which detects an amount of developer
remaining in the developing means,

wherein, in the preparation process before image
formation of the second and subsequent times using the
developing means, in the state in which the image
10 bearing member and the developer carrying member are
separated from each other, the control means operates
the developer carrying member for the predetermined
period of time according to the lapsed time and
information on the developer remaining amount detected
15 by the developer remaining amount detection means.

3. An image forming apparatus according to claim
1, further comprising environment detection means which
detects an environmental state of an apparatus main
20 body,

wherein, in the preparation process before image
formation of the second and subsequent times using the
developing means, in the state in which the image
bearing member and the developer carrying member are
25 separated from each other, the control means operates
the developer carrying member for the predetermined
period of time according to the lapsed time and

information on the environmental state detected by the environment detection means.

4. An image forming apparatus according to claim
5 1,

wherein the operation of the developer carrying member for the predetermined period of time is an operation for giving a charge to the developer.

10 5. An image forming apparatus according to claim
1,

wherein the preparation process before image formation is a preparation process before the developer carrying member carries the developer to the
15 electrostatic latent image.

6. An image forming apparatus according to claim
1,

wherein the developer is a mono-component
20 nonmagnetic toner.

7. An image forming apparatus according to claim
1,

wherein the developer has a shape factor SF1 of
25 100 to 160 and a shape factor SF2 of 100 to 140.

8. An image forming apparatus according to claim

1,

wherein the developing means is a development cartridge which is detachably attachable to the image forming apparatus.

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9. A control method for an image forming apparatus for controlling an image forming operation in an image forming apparatus including: an image bearing member; developing means which contains a developer and which has a rotatable developer carrying member, which abuts against the image bearing member, and storage means storing information on image formation history, the developing means being adapted to form an image on the image bearing member as the developer carrying member carries the developer to the image bearing member; a contact/separation mechanism which enables the developer carrying member to abut against and separate from the surface of the image bearing member; and reading/writing means which accesses the storage means, the control method comprising:

reading the information on image formation history stored in the storage means with the reading/writing means before image formation of a second and subsequent times using the developing means; finding a lapsed time from a finish time of image formation of the last time until a start time of image formation of this time based upon the information on

image formation history; and

operating, in a state in which the image bearing member and the developer carrying member are separated from each other by the contact/separation mechanism, 5 the developer carrying member for a predetermined period of time according to the lapsed time.

10. A control method for an image forming apparatus according to claim 9,

10 wherein the image forming apparatus further comprises developer remaining amount detection means which detects an amount of developer remaining in the developing means, the control method further comprising:

15 operating, in the state in which the image bearing member and the developer carrying member are separated from each other, the developer carrying member for the predetermined period of time according to the lapsed time and information on the developer 20 remaining amount detected by the developer remaining amount detection means.

11. A control method for an image forming apparatus according to claim 9,

25 wherein the image forming apparatus further comprises environment detection means which detects an environmental state of an apparatus main body, the

control method further comprising:

operating, in the state in which the image bearing member and the developer carrying member are separated from each other, the developer carrying member for the predetermined period of time according to the lapsed time and information on the environmental state detected by the environment detection means.

12. A control method for an image forming apparatus according to claim 9,

wherein the operation of the developer carrying member for the predetermined period of time is an operation for giving a charge to the developer.

13. An image forming apparatus, comprising:

an image bearing member on a surface of which an electrostatic latent image is formed;

developing means which contains a developer and which has: a rotatable developer carrying member, which abuts against the surface of the image bearing member; and storage means storing information on image formation history, said developing means being adapted to visualize the electrostatic latent image on the surface of the image bearing member as the developer carrying member carries the developer to the electrostatic latent image;

a contact/separation mechanism which enables the

developer carrying member to abut against and separate
from the surface of the image bearing member; and
control means which, in a preparation process
before image formation using the developing means,
5 judges whether or not the developing means is in an
unused state based upon existence of information on
image formation history stored in the storage means and,
in the case in which the developing means is recognized
as being in the unused state, operates the developer
10 carrying member for a predetermined period of time in a
state in which the developer carrying member is
separated from the surface of the image bearing member.

14. An image forming apparatus according to claim
15 13,

wherein color information of the developer
contained in the developing means is further stored in
the storage means, and
in the preparation process before image formation
20 using the developing means, in the case in which the
developing means is recognized as being in the unused
state, the control means controls an operation time of
the developer carrying member according to the color
information of the contained developer stored in the
25 storage means.

15. An image forming apparatus according to claim

13, further comprising environment detection means
which detects an environmental state of an apparatus
main body,

wherein, in the preparation process before image
5 formation using the developing means, in the case in
which the developing means is recognized as being in
the unused state, the control means controls an
operation time of the developer carrying member
according to the information on the environmental state
10 detected by the environment detection means.

16. An image forming apparatus according to claim
13,

wherein the operation of the developer carrying
15 member for the predetermined period of time is an
operation for giving a charge to the developer.

17. An image forming apparatus according to claim
13,

20 wherein before image formation means at least
before the developer carrying member carries the
developer to the electrostatic latent image.

18. An image forming apparatus according to claim
25 13,

wherein the developer is a mono-component
nonmagnetic toner.

19. An image forming apparatus according to claim
13,

wherein the developer has a shape factor SF1 of
100 to 160 and a shape factor SF2 of 100 to 140.

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20. An image forming apparatus according to claim
13,

wherein the developing means is a development
cartridge which is detachably attachable to the image
10 forming apparatus.

21. A control method for an image forming
apparatus including: an image bearing member;
developing means which contains a developer and which
15 has a rotatable developer carrying member, which abuts
against the image bearing member, and storage means
storing information on image formation history, the
developing means being adapted to form an image on the
image bearing member as the developer carrying member
20 carries the developer to the image bearing member; a
contact/separation mechanism which enables the
developer carrying member to abut against and separate
from the surface of the image bearing member; and
reading/writing means which accesses the storage means,
25 the control method comprising:

reading the information on image formation
history stored in the storage means with the

reading/writing means before image formation using the
developing means;

judging whether or not the developing means is in
an unused state according to presence or absence of the
5 information on image formation history; and

operating, in the case in which the developing
means is judged to be in the unused state, the
developer carrying member for a predetermined period of
time in a state in which the developer carrying member
10 is separated from the image bearing member.

22. A control method for an image forming
apparatus according to claim 21,

wherein color information of the developer
15 contained in the developing means is further stored in
the storage means, the control method further
comprising:

reading, in the case in which the developing
means is judged to be in the unused state, the color
20 information of the contained developer recorded in the
storage means with the reading/writing means; and

operating the developer carrying member for the
predetermined period of time according to the color
information of the contained developer.

25

23. A control method for an image forming
apparatus according to claim 21,

wherein the image forming apparatus further comprises environment detection means which detects an environmental state of an apparatus main body, the control method further comprising:

5 operating, in the case in which the developing means is judged to be in the unused state, the developer carrying member for the predetermined period of time according to information on the environmental state obtained by the environment detection means.

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24. A control method for an image forming apparatus according to claim 21,

 wherein the operation of the developer carrying member for the predetermined period of time is an
15 operation for giving a charge to the developer.

25. An image forming apparatus, comprising:

 an image bearing member on a surface of which an electrostatic latent image is formed;

20 developing means which contains a developer and which has a rotatable developer carrying member, which abuts against the surface of the image bearing member, said developing means being adapted, in a state in which the developer carrying member is brought into
25 contact with the image bearing member, to carry the developer from the developer carrying member to the electrostatic latent image to thereby visualize the

electrostatic latent image on the surface of the image bearing member;

a contact/separation mechanism which enables the developer carrying member to abut against and separate
5 from the surface of the image bearing member; and

control means which, in a state in which the developer carrying member is separated from the surface of the image bearing member, operates the developer carrying member for a predetermined period of time
10 based upon a state of the developing means.

26. An image forming apparatus according to claim 25,

wherein, in the case in which the developing
15 means is in an unused state, the control means operates the developer carrying member for the predetermined period of time in the state in which the developer carrying member is separated from the surface of the image bearing member.

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27. An image forming apparatus according to claim 25,

wherein, in the case in which the developing means is in an unused state, the control means operates
25 the developer carrying member for the predetermined period of time in the state in which the developer carrying member is separated from the surface of the

image bearing member based upon color information of the developer.

28. An image forming apparatus according to claim
5 25,

wherein, in the case in which the developing means is in an unused state, the control means operates the developer carrying member for the predetermined period of time in the state in which the developer
10 carrying member is separated from the surface of the image bearing member based upon environmental information of an apparatus main body.

29. An image forming apparatus according to claim
15 25,

wherein the operation of the developer carrying member for the predetermined period of time is an operation for giving a charge to the developer.

20 30. An image forming apparatus, comprising:
an image bearing member on a surface of which an electrostatic latent image is formed;

developing means which contains a developer and which has a rotatable developer carrying member, which
25 abuts against the surface of the image bearing member, the developing means being adapted to visualize the electrostatic latent image on the surface of the image

bearing member as the developer carrying member carries the developer to the electrostatic latent image; and

control means which operates the developer carrying member according to a lapsed time from a finish time of image formation of the last time until a start time of image formation of this time.

31. An image forming apparatus according to claim 30,

10 wherein, in a state in which the developer carrying member is separated from the surface of the image bearing member, the control means operates the developer carrying member for a predetermined period of time based upon the lapsed time and information on a remaining amount of the developer in the developing means.

32. An image forming apparatus according to claim 30,

20 wherein, in a state in which the developer carrying member is separated from the surface of the image bearing member, the control means operates the developer carrying member for a predetermined period of time based upon the lapsed time and environmental information of an apparatus main body.

33. An image forming apparatus according to claim

31,

wherein the operation of the developer carrying member for the predetermined period of time is an operation for giving a charge to the developer.

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34. An image forming apparatus comprising:

an image bearing member on a surface of which an electrostatic latent image is formed;

developing means which contains a developer and
10 which has: a rotatable developer carrying member, which abuts against the surface of the image bearing member; and a regulating member for giving charge to the developer on the developer carrying member and for regulating the developer, the developing means being
15 adapted to visualize the electrostatic latent image on the surface of the image bearing member as the developer carrying member carries the developer to the electrostatic latent image; and

a contact/separation mechanism which enables the
20 developer carrying member to abut against and separate from the surface of the image bearing member; and

control means which, in a state in which the developer carrying member is separated from the surface of the image bearing member, operates the developer
25 carrying member for a predetermined period of time based upon a state of the developing means.

35. An image forming apparatus according to claim
34,

wherein, in the case in which the developing
means is in an unused state, the control means operates
5 the developer carrying member for the predetermined
period of time in the state in which the developer
carrying member is separated from the surface of the
image bearing member.

10 36. An image forming apparatus according to claim
34,

wherein the control means operates the developer
carrying member for the predetermined period of time in
the state in which the developer carrying member is
15 separated from the surface of the image bearing member
according to a left unattended time of the developing
means.

20 37. An image forming apparatus according to claim
34,

wherein the operation of the developer carrying
member for the predetermined period of time is an
operation for giving a charge to the developer.